Remarks

This amendment is submitted in response to the Official Action mailed March 23, 2006.

Review and reconsideration of this application are respectfully requested.

Claims 1-2, 8-10 and 20-22 remain in this application.

No new matter has been added as a result of the amendments to claims 1, 2, 8-10 and 20, nor would the amendments cause any undue additional search or effort on the part of the Office.

Claim 20 is objected to as being improperly marked up, but correctly labeled as "(previously Presented)". In view of the above amendments to claim 20, it is believed that claim 20 is now properly labeled and marked up. Claim 20 has been amended to correct any ambiguity with respect to the "comprising" and "consisting of" terminology defining the tubular structure and the ethylene-vinyl acetate copolymer of the present invention. Accordingly, it is believed that this objection can now be with drawn.

Applicant notes and appreciates the examiner's withdrawal of the previous objection to claim 22.

Repeated Rejections

Claim Rejections – 35 U.S.C. § 103

It is noted that the repeated rejection of claims 1-4, 6-10 and 20-22 made of record in the previous office action is under 35 U.S.C. 102 rather than the presently indicated 35 U.S.C. 103.

With regard to claims 1, the examiner again asserts that the tubular structure of Igarashi et al. (5,223,571) exhibits heat tolerant characteristics because Igarashi et al. teach that the tubular structure is heat resistant (col. 2, lines 50-54). Any hose is resistant to some degree of pressure,

so the hose of Igarashi et al. necessarily exhibits pressure resistant characteristics. The tubular structure of Igarashi et al. exhibits hydrocarbon fluid impermeability characteristics since Igarashi et al. teach that the tubular structure is gas impermeable (col. 2, lines 50-53). In further regard to claim 1, the tubular structure of Igarashi et al. comprises a vinyl ester copolymer matrix (ethylene-vinyl acetate copolymer, col. 3, lines 32-35 and col. 4, lines 22-26) where the vinyl ester copolymer matrix contains greater than 40% vinyl ester based on the weight of the copolymer (col. 3, lines 48-51).

In regard to claim 10, Igarashi et al. teach that the tubular structure is for conveying refrigerant in car coolers, air conditioners and other refrigerant-using devices (col. 2, lines 54-57), a teaching which falls within the scope of the fluids in an automotive engine cooler, transmission oil cooler, power transmission cooler, radiator or heater. The tubular structure of Igarashi et al. comprises an ethylene-vinyl acetate copolymer matrix (col. 3, lines 32-35 and col. 4, lines 22-26).

New Rejection

Claim Rejection – 35 U.S.C. § 112

Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The recitation "consisting essentially of an ethylene-vinyl acetate copolymer matrix" in line 4 of the claim is contradictory to the language of lines 4-7 of the claim, which requires about 40 to 55% of one or more additives chosen from the seven categories of additives recited in the remainder of the claim.

Examiner's Response to Applicant's Previous Arguments

Applicant's arguments regarding the 35 U.S.C. 102 rejection of the claims presented on page 9-17 of the previous amendment A have been fully considered but are not persuasive.

On pages 9-10 of Amendment A, applicant argues that saponified ethylene-vinyl acetate is not ethylene-vinyl acetate; however, since Igarashi et al. recommends that the degree of saponification be at least 90%, in instances where the degree of saponification is less than 100%, the tubular structure comprises vinyl acetate copolymer matrix as claimed in claim 1. The teaching of Igarashi et al. that the heat resistance "tends to be lowered to an insufficient level" is inconclusive and therefore does not teach away from applicant's claimed subject matter.

In regard to applicant's discussion regarding the CPA resin of Igarashi et al. on page 10 of amendment A, claim 1 does not exclude another resin, such as CPA resin, form the scope of the claim.

In regard to applicamt's discussion regarding claims 4-6 on pages 10-13 of amendment A, in instances where the degree of saponification is less than 100%, the tubular structure comprises vinyl acetate copolymer matrix as claimed in claim 1.

Applicant's argument regarding claims 7-9 depends entirely upon applicant's arguments regarding the rejection to claim 4.

On pages 13-16 of amendment A, applicant argues that saponified ethylene-vinyl acetate is not ethylene vinyl acetate; however, since Igarashi et al. recommends that the degree of saponification be at least 90%, in instances where the degree of saponification is less than 100%, the tubular structure comprises vinyl acetate copolymer matrix as claimed in claims 10 and 20. The teaching of Igarashi et al. that the heat resistance "tends to be lowered to an insufficient level" is inconclusive and therefore does not teach away from applicant's claimed subject matter.

Response to rejections and Examiner's Comments

With respect to claim 1, applicant contends that the present tubular structure comprises a matrix material consisting essentially of an ethylene-vinyl acetate copolymer containing greater

than 40% vinyl ester. Igarashi et al., on the other hand, teach a refrigeration transport hose comprising an inner tube comprising a refrigerant gas-impermeable resinous layer formed of a very specific polyamide resin produced by the reaction of hexamethylene diamine and an aliphatic dicarboxylic acid having eight to sixteen carbon atoms (CPA resin); an outer rubber layer; and a reinforcing fiber layer between the inner layer and the outer layer. Igarashi et al have found that common polyamides resins are not suitable and that only the specific polyamide resin produced by condensation of hexamethylene diamine and an aliphatic dicarboxylic acid whose molecule has 8 to 16 carbon atoms is satisfactory in regard to the three requirements (of their invention), i.e., high gas impermeability, flexibility and heat resistance (col. 2, lines 33-43). In one embodiment, the inner layer contains 100% of the CPA resin (col. 3, lines 30-31). In a second embodiment, the inner layer further contains a saponified ethylene-vinyl acetate copolymer in addition to the CPA resin (col. 3, lines 32-34). Applicant maintains that saponified ethylene-vinyl acetate is not an ethylene-vinyl acetate copolymer and, in fact, has a totally distinct structure from ethylene-vinyl acetate copolymer. It would appear that the examiner views the saponified ethylene-vinyl acetate copolymer as a multitude of individual ethylene-vinyl acetate units wherein some of the individual ethylene-vinyl acetate units are saponified and some of the individual ethylene-vinyl acetate units are not saponified. When the degree of saponification is 90%, the examiner appears to conclude that 90% of the individual ethylene vinyl acetate units are saponified, but that the remaining 10% of individual ethylene-vinyl acetate copolymer units are not saponified; therefore, according to the examiner, the saponified ethylene-vinyl acetate copolymer of Igarashi et al. must contain some ethylene-vinyl acetate copolymer. Applicant submits that ethylene-vinyl acetate copolymers are of an extremely long chain length and such copolymers contain hundreds of thousands of ethylene and vinyl acetate units interconnected with each other along the copolymer chain. Saponification of such ethylene-vinyl acetate copolymer involves the saponification of some of the vinyl acetate units, but not all of the vinyl acetate units. In those instances where the saponification is 100%, all of the vinyl acetate units along the copolymer chain are saponified and the resulting saponified ethylene vinyl acetate copolymer is an ethylene-vinyl alcohol copolymer. However, in those instances where the saponification is 90%, for example, only 90% of the vinyl acetate units along the copolymer chain are saponified, leaving 10% of the vinyl acetate units

along the copolymer chain unaffected. In that instance where only 90% of the vinyl acetate units along the copolymer chain are saponified, the saponified ethylene-vinyl acetate copolymer contains units of ethylene, vinyl acetate, and vinyl alcohol along the copolymer chain and such saponified ethylene-vinyl acetate copolymer which is less than 100% saponified is an ethylene-vinyl acetate-vinyl alcohol terpolymer. Therefore, since Igarashi et al recommends that greater than 40 mol% and at least 90 mol % of the vinyl acetate of the ethylene-vinyl acetate copolymer be saponified (col. 3, lines 39-42) in order to provide a product having a sufficient level of heat resistance (col. 3, lines 43-47), applicant submits that the saponified ethylene-vinyl acetate copolymer of Igarashi et al. is an ethylene-vinyl alcohol copolymer when the degree of saponification is 100%, and is an ethylene-vinyl acetate-vinyl alcohol terpolymer when the degree of saponification is less than 100%. In either case, the saponified ethylene-vinyl acetate copolymer of Igarashi et al is structurally and distinctly different from the ethylene-vinyl acetate copolymer of the present invention. Therefore, applicant contends that the present invention is not anticipated by Igarashi et al, nor is there any teaching in Igarashi et al which would lead one of ordinary skill in the art to the present invention. In fact, since Igarashi et al. specifically state that if the degree of saponification is less than 90 mol %, the heat resistance of the product formed of the resinous composition tends to be lowered to an unsatisfactory level, indicating that as the saponification of the saponified ethylene-vinyl acetate copolymer is decreased, the heat resistance of the structure is lowered to an unsatisfactory level. Presumably, one can infer that if the ethylene-vinyl acetate copolymer was not saponified, the heat resistance would be totally unsatisfactory. Therefore, applicant contends that Igarashi et al. actually teach away from the present invention.

Furthermore, as stated earlier Igarashi et al. requires the presence of a CPA resin which must be employed either with or without the saponified ethylene-vinyl acetate copolymer. In view of the above amendments to claims 1, 10 and 20, applicant submits that the present invention excludes the presence of a CPA resin as a matrix material.

The examiner asserts that the tubular structure of Igarashi et al. exhibits hydrocarbon fluid impermeability characteristics since Igarashi et al. teach that the tubular structure is gas

impermeable. Applicant submits that gas impermeability does not necessarily translate to hydrocarbon fluid impermeability. Gas relates to the state of the material and, in the application of Igarashi et al., the gas is used for cooling such as in refrigeration and air conditioning devices. Such devices typically employ fluorocarbons or aqueous fluids in the form of gas. Accordingly, applicant submits that the present invention is neither anticipated nor obvious over the teachings of Igarashi et al.

The examiner's attention is directed to claims 1, 10 and 20 where applicant has amended those claims to specifically claim a tubular structure "comprising:" (1) a matrix material which is defined as "consisting essentially of" ethylene-vinyl acetate copolymer; and (2) one or more additives. Therefore, the claims now define a tubular structure "comprising" a polymeric matrix material and one or more additives, wherein the matrix material "consists essentially of" an ethylene-vinyl acetate copolymer. Such terminology now excludes the presence of a saponified ethylene-vinyl acetate copolymer (ethylene-vinyl acetate-vinyl alcohol terpolymer) and the CPA resin of Igarashi et al. Since Igarashi et al. specifically require the presence of a CPA (a specific polyamide resin produced by condensation polymerization of hexamethylene diamine and an aliphatic dicarboxylic acid whose molecule has 8 to 16 carbon atoms) resin, or a CPA resin further containing saponified ethylene-vinyl acetate copolymer, applicant submits that the present claims are neither anticipated nor obvious over the teachings of Igarashi et al.

The gas impermeable resinous composition of Igarashi et al. contains not more than 250 parts by weight of the saponified ethylene-vinyl acetate copolymer per 100 parts by weight of the CPA resin (Col. 3, lines 48-51). In contradistinction to the resinous composition of Igarashi et al., the tubular structure of the present invention does not contain the "CPA" resin defined by Igarashi et al as a specific polyamide resin produced by condensation polymerization of hexamethylene diamine and an aliphatic carboxylic acid whose molecule has 8 to 16 carbon atoms (col. 2., lines 35-38).

With respect to claim 2, applicant submits that the resinous composition of Igarashi et al.

is, in one embodiment, a 100% CPA resin (col. 3, lines 29-32). In a second embodiment, the resinous composition may further contain saponified ethylene-vinyl acetate copolymer in addition to the CPA resin (col. 3, lines 32-34). In the second embodiment, the resinous composition contains not more than 250 parts of saponified ethylene-vinyl acetate copolymer per 100 parts by weight of the CPA resin (Col. 3, lines 48-51). If the proportion of the copolymer exceeds 250 parts by weight, the flexibility of the product is insufficiently low (col. 3. lines 51-54). The ethylene-vinyl acetate copolymer of Igarashi et al. is not necessarily 100% saponified and therefore may contain some residual vinyl acetate units. The saponified ethylene-vinyl acetate copolymer of Igarashi et al is more appropriately characterized as being a CPA-ethylene-vinyl acetate-saponified vinyl acetate (vinyl alcohol) terpolymer when the degree of saponification is less than 100%. As argued above, the resinous composition of Igarashi et al. is either a 100% CPA resin, a CPA resin containing an ethylene-saponified vinyl acetate copolymer, or a CPA resin containing an ethylene-saponified vinyl acetate (vinyl alcohol)-vinyl acetate terpolymer, each of which is distinctly different from the vinyl ester copolymer defined in claim 2 of the present invention. Therefore, applicant contends that claim 2 is neither anticipated nor rendered obvious by Igarashi et al.

Claims 3-7 have been canceled by this amendment.

With respect to claim 8, applicant submits that the ethylene-vinyl acetate copolymer tubular structure of the present invention is neither anticipated or rendered obvious by the patent to Igarashi et al. as argued above. Furthermore, since claim 8 merely recites further limitations of a base claim which is considered allowable, applicant submits that dependent claim 8 also is neither anticipated nor rendered obvious by the patent to Igarashi et al.

With respect to claim 9, applicant submits that the ethylene-vinyl acetate copolymer tubular structure of the present invention is neither anticipated or rendered obvious by the patent to Igarashi et al. as argued above and, since claim 9 merely recites further limitations of a base claim from which claim 9 depends, applicant submits that claim 9 also is neither anticipated nor

rendered obvious by the patent to Igarashi et al.

With respect to claim 10, applicant contends that the present tubular structure comprises about 45 to 60% of a matrix material consisting essentially of an ethylene-vinyl acetate copolymer an ethylene- vinyl acetate copolymer having a vinyl acetate content of up to about 90% based on the weight of the copolymer; and about 40 to 55% of one or more additives selected from the group consisting of process aids, fillers, plasticizers, metal oxides, metal hydroxides, peroxides, coagents, antioxidants and combinations thereof. In contradistinction to the tubular structure of the present invention, Igarashi et al. teach a refrigeration transport hose comprising an inner tube comprising a refrigerant gas-impermeable resinous layer formed of a very specific polyamide resin produced by the reaction of hexamethylene diamine and an aliphatic dicarboxylic acid having eight to sixteen carbon atoms (CPA resin); an outer rubber layer; and a reinforcing fiber layer between the inner layer and the outer layer. Igarashi et al have found that common polyamides resins such as nylon 6 and nylon 6-66 copolymer are not suitable and that only the specific polyamide resin produced by condensation of hexamethylene diamine and an aliphatic dicarboxylic acid whose molecule has 8 to 16 carbon atoms is satisfactory in regard to the three requirements (of their invention), i.e., high gas impermeability, flexibility and heat resistance (col. 2, lines 33-43). In one embodiment, the inner layer contains 100% of the CPA resin (col. 3, lines 30-31). In a second embodiment, the inner layer further contains a saponified ethylene-vinyl acetate copolymer in addition to the CPA resin (col. 3, lines 32-34). Applicant submits that saponified ethylene-vinyl acetate is not ethylene-vinyl acetate. Saponified ethylene-vinyl acetate copolymer is structurally distinct from ethylene-vinyl acetate copolymer. Furthermore, Igarashi et al requires that at least 90 mol % of the vinyl acetate of the ethylene-vinyl acetate copolymer be saponified (col. 3, lines 39-42) in order to provide a product having a sufficient level of heat resistance (col. 3, lines 43-47). Applicant submits that the saponified ethylene-vinyl acetate copolymer of Igarashi et al. is a copolymer of ethylene and saponified vinyl acetate when the degree of saponification is 100%, and is a terpolymer of ethylene, saponified vinyl acetate and vinyl acetate when the degree of saponification is less than 100%. In either case, the saponified ethylene-vinyl acetate copolymer of Igarashi et al is structurally different from the vinyl ester copolymer of the present invention.

Therefore, applicant contends that claim 10 of the present invention is not anticipated by Igarashi et al, nor is there any teaching in Igarashi et al which would lead one of ordinary skill in the art to the present invention as defined by claim 10. In fact, since Igarashi et al. specifically state that if the degree of saponification is less than 90 mol %, the heat resistance of the product formed of the resinous composition tends to be lowered to an unsatisfactory level, indicating that as the saponification of the saponified ethylene-vinyl acetate copolymer is decreased, the heat resistance of the structure is lowered to an unsatisfactory level. Presumably, one can infer that if the ethylene-vinyl acetate copolymer was not saponified, the heat resistance would be totally unsatisfactory. Therefore, applicant contends that Igarashi et al. actually teach away from the present invention.

Claims 11-19 have been canceled as being directed to a non-elected invention.

With respect to claim 20, applicant contends that claim 20 is presented in Jepson form to define the improvement in an automotive fluid-conveying tubular structure wherein the improvement comprises employing as the tubular structure a vulcanized heat tolerant, pressure resistant, hydrocarbon fluid impermeable composition comprising about 30 to 70% of a matrix material consisting essentially of an ethylene-vinyl acetate copolymer; and about 25 to 70% of one or more additives selected from the group consisting of process aids, fillers, plasticizers, metal oxides, metal hydroxides, peroxides, coagents, antioxidants and combinations thereof. The ethylene-vinyl acetate copolymer matrix has greater than about 40% vinyl acetate based on the weight of the copolymer. In contradistinction to the tubular structure defined by claim 20, Igarashi et al. teach a refrigeration transport hose comprising an inner tube comprising a refrigerant gas-impermeable resinous layer formed of a very specific polyamide resin produced by the reaction of hexamethylene diamine and an aliphatic dicarboxylic acid having eight to sixteen carbon atoms (CPA resin); an outer rubber layer; and a reinforcing fiber layer between the inner layer and the outer layer. Igarashi et al have found that common polyamides resins such as nylon 6 and nylon 6-66 copolymer are not suitable and that only the specific polyamide resin produced by condensation of hexamethylene diamine and an aliphatic dicarboxylic acid whose molecule has

8 to 16 carbon atoms is satisfactory in regard to the three requirements (of their invention), i.e., high gas impermeability, flexibility and heat resistance (col. 2, lines 33-43). In one embodiment, the inner layer contains 100% of the CPA resin (col. 3, lines 30-31). In a second embodiment, the inner layer further contains a saponified ethylene-vinyl acetate copolymer in addition to the CPA resin (col. 3, lines 32-34). Applicant submits that saponified ethylene-vinyl acetate is not ethylene-vinyl acetate. Saponified ethylene-vinyl acetate copolymer is structurally distinct from ethylene-vinyl acetate copolymer. Furthermore, Igarashi et al requires that at least 90 mol % of the vinyl acetate of the ethylene-vinyl acetate copolymer be saponified (col. 3, lines 39-42) in order to provide a product having a sufficient level of heat resistance (col. 3, lines 43-47). Applicant submits that the saponified ethylene-vinyl acetate copolymer of Igarashi et al. is a copolymer of ethylene and saponified vinyl acetate when the degree of saponification is 100%, and is a terpolymer of ethylene, saponified vinyl acetate and vinyl acetate when the degree of saponification is less than 100%. In either case, the saponified ethylene-vinyl acetate copolymer of Igarashi et al is structurally different from the vinyl ester copolymer of the present invention. Therefore, applicant contends that claim 10 of the present invention is not anticipated by Igarashi et al, nor is there any teaching in Igarashi et al which would lead one of ordinary skill in the art to the present invention as defined by claim 10. In fact, since Igarashi et al. specifically state that if the degree of saponification is less than 90 mol %, the heat resistance of the product formed of the resinous composition tends to be lowered to an unsatisfactory level, applicant contends that Igarashi et al actually teach away from the present invention as defined by claim 10. Accordingly, applicant submits that claim 10 is not obvious over the teachings of Igarashi et al.

With respect to claim 21, applicant submits that since the ethylene-vinyl acetate copolymer tubular structure of claim 1 is considered to be neither anticipated or rendered obvious by the patent to Igarashi et al. as argued above, claim 21 which merely recites further limitations of the base claim, applicant submits that claim 21 also is neither anticipated nor rendered obvious by the patent to Igarashi et al.

With respect to claim 22, applicant submits that since the ethylene-vinyl acetate copolymer

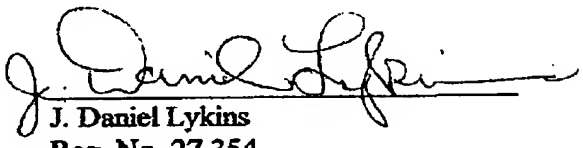
tubular structure of claim 1 is considered to be neither anticipated or rendered obvious by the patent to Igarashi et al. as argued above, claim 22 which merely recites further limitations of the base claim, applicant submits that claim 22 also is neither anticipated nor rendered obvious by the patent to Igarashi et al.

Summary

Applicant contends that Igarashi et al teach a gas impermeable resinous composition formed from a very specific polyamide produced by condensation polymerization of hexamethylene diamine and an aliphatic carboxylic acid whose molecule has 8 to 16 carbon atoms (CPA) as the resinous matrix. The resinous matrix may be 100% CPA or the resinous matrix may contain a saponified ethylene-vinyl acetate copolymer in addition to the CPA. It is noteworthy that Igarashi et al. make an intentional and purposeful effort to saponify the ethylene-vinyl acetate copolymer to the extent that greater than 90% of the vinyl acetate units are saponified in order to provide a resinous material of which would be effective for his particular purpose. As argued above, the structure of 100% saponified ethylene-vinyl acetate copolymers provides an extremely long chain of ethylene units and interconnected vinyl alcohol units resulting from the 100% saponification of all of the vinyl acetate units; and the structure of the less than 100% saponified ethylene-vinyl acetate copolymers provides an extremely long chain of ethylene units, interconnected vinyl alcohol units resulting from the saponification of some of the vinyl acetate units, and some unaffected vinyl acetate units which remain vinyl acetate because not all of the vinyl acetate units are saponified. Applicant submits that the structure of the 100% saponified ethylene-vinyl acetate copolymer (ethylene-vinyl alcohol copolymer) and the structure of the less than 100% saponified ethylene-vinyl acetate copolymer (ethylene-vinyl acetate-vinyl alcohol terpolymer) are distinctly different from ethylene-vinyl acetate copolymers of the present invention and, in the absence of evidence to the contrary, one could not predict the behavior of an ethylene-vinyl acetate copolymer based upon the known behavior of an ethylene-vinyl alcohol or an ethylene-vinyl acetate-vinyl-alcohol terpolymer in a specific environment which may be the same or different. Accordingly, one structure neither anticipates nor obviates the other structure.

In view of the forgoing amendments and remarks, it is believed that the present application is now in condition for allowance and an early indication thereof is earnestly solicited.

Respectfully submitted,



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